Risk Assessment and Expert Opinion in Implementing Policy - Exceptional Circumstances.

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Abstract

The Bureau of Rural Sciences regularly provides assessments to underpin decision making on applications from States for Exceptional Circumstances (EC). Exceptional Circumstances occur when rare biophysical events, such as agricultural drought, have a severe impact on production.

A regional risk assessment framework, based on the causal relationship between the risk (input) and the impact on production (output), that incorporates information systems has been developed to undertake this analysis and advice. While there are good objective indicators of climate risks, or inputs, and of agricultural production, or outputs, there are considerable uncertainties regarding the role of risk management decisions and practices. Agricultural professionals working in regions can assist with risk identification and communication through the generation of information, tactics and viable management options. These activities raise awareness of risk and can improve the capacity of farming communities to manage them.

Key words

Risk analysis, drought policy, climate variability.

Introduction

Agriculture in Australia operates in a highly variable environment: it exports up to 80 percent of its products and encounters ongoing cycles of drought, flood, and other climatic risks. In 1992, the National Drought Policy directed government assistance to rural Australia towards *self-reliance*, where drought is seen as a normal part of the production environment and farmers—in association with agricultural professionals—are the key decision makers and managers of financial and climate risks. Subsequently, Commonwealth and State/Territory Governments have phased out transaction-based support schemes, such as subsidies for livestock and fodder transport.

In this environment the generation, availability and use of *information* in a strategic decision making framework is a critical component of the farm business (2). Information — on natural resource status, technology, innovations, business inputs, financial indicators, and the supply chain — and its conversion to knowledge for decision-making is the currency of farm risk management and agricultural professionals.

Exceptional Circumstances Policy (EC)

Within the context of self-reliance, the Rural Adjustment Scheme of 1992 recognised that there are rare and severe events, which are outside farmers' normal planning, and risk management capabilities. In these cases Governments may provide short-term targeted assistance in the form of interest rate subsidies and welfare payments to long term viable farmers. The Commonwealth's *Agriculture-Advancing Australia* package of 1997 continued to recognise that there are exceptional circumstances beyond the scope of normal risk management and in these exceptions the Government should provide assistance. The most common cause of such exceptional circumstances over the past 3 years was drought, but applications for other events such as heavy rain, frost, and combinations of drought with pest outbreaks have also been successful.

From 1996-1999 we were involved in the analysis of regions applying for EC, providing objective and technical assessment to the Rural Adjustment Scheme Advisory Council (RASAC, now the National Rural Advisory Council). RASAC critically assessed our information along with a range of other analyses

including work from ABARE, before providing a recommendation to the Commonwealth Minister for Agriculture, Fisheries and Forestry, who would then consult with Cabinet for a decision for declaration.

Framework and scientific evidence

The present process was approved by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) in March 1999. The ARMCANZ criteria define 'rare' events as those that occur, on average, once every 20 to 25 years, requiring assessment of both the historical frequency of climate events and their economic impact. The severity of events is determined by their economic impact, and should last greater than 12 months, affecting a significant number of farm businesses in a region or industry. The key indicator, a severe income downturn, should be tied to a specific rare and severe event, and be beyond normal risk management strategies employed by responsible farmers.

Risk management, or the specific agricultural practices used throughout a rare and severe event, is not an explicit criterion in the assessment. However, continuous improvement of risk management is seen as an important underlying aspect of the policy, and the criteria for assessment and the way they are analysed have been developed to reflect this.

Integrative framework

The EC decision making process is characterised by short and changing time frames, a broad variety of agricultural systems, multi-disciplinary information, and analyses at a regional scale. Because of this a working framework, first outlined by our former colleague Richard Williams, was used in the research and interpretative phases to integrate the evidence required in making scientific judgements (Figure 1).

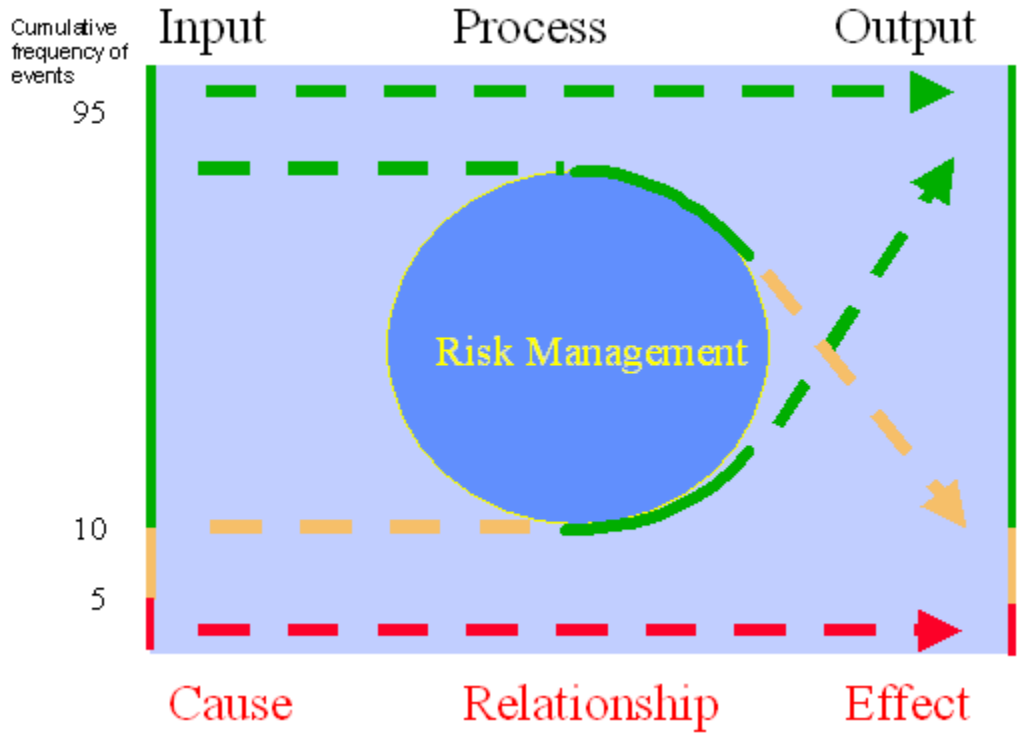

Figure 1. An input-output (cause-effect) framework for assessing scientific evidence at regional scales for exceptional circumstances applications.

Key features of the framework are: that there is an obvious causal linkage between input (cause) and the output (effect) or impact; that risk management can alter the relationship between the degree of input and

degree of output; that in exceptional circumstances most producers will suffer a direct relationship between cause and effect; that there is a degree of uncertainty between the 5% level and the 10% level. In the current policy, the output is defined as income, with physical outputs being a preliminary step to achieving this.

Scientific evidence

The analysis, which is basically a risk assessment on the inputs, places the event in a spatial and temporal scale. The event, be it a meteorological drought (rainfall deficit), an out of season frost, or a series of high rainfall events leading to water logging, is typically analysed using a range of historical data sets from the Bureau of Meteorology. The key aspect of the analysis is to integrate the historical data, typically from individual meteorological recording stations, with an appropriate spatial model of the region (for examples see http://www.brs.gov.au/agrifood/climag.html). Agronomic simulations have also been used to test the likely effectiveness of rainfall for a given production scenario. A range of techniques, particularly for drought, can be found in White (5).

Measurement of outputs or impacts was often more difficult because the data either were not available at the same historical or spatial extent as climate data, or didn't fully cover the critical points of the analysis. For instance, Australian Bureau of Statistics (ABS) and industry owned production data can provide useful information, but have limitations because of changes to the collection areas and questions asked in the Agricultural Census. Interpretations of animal numbers have to account for the development of feedlots and agistments off-farm, and estimates of total grazing pressure lack data on non-commercial grazers such as rabbits, kangaroos, goats, geese and grasshoppers. Remote sensing technologies have also been put to good use, and BRS is collaborating in research that may allow us to assess biomass from satellite in the future. Good measurements of production at local and regional scales, that are also capable of delivering timely information, are sadly missing in Australian agriculture. Data from research trials and industry benchmarking activities can provide valuable supplementary evidence here. The impacts, like the inputs, needed to be measured at the regional scale. In some situations individual farms may have been experiencing a rare event and severe impact, but this was not evident over the whole region.

Interpretation

An interpretation of the relationship between the input and output measures can be illuminating. Some well-validated simulation studies have been used to assess the likely impact of an event on grass growth, wheat yield and animal production. However, we have observed several occasions where this did not follow—the inputs were at high levels, and models indicated this should have led to at least moderate production potential, but the outputs as surveyed were much less.

In such instances we looked at the risk management component of our framework in more detail. Evaluating the degree to which the measured inputs had been influenced by management decisions across the region, and the implications for outputs, was difficult and led to a more subjective judgement. We attempted to characterise 'regional agricultural practices', which *might* have been employed during these periods, based on documentation such as the timing of stock removal and known implications for the pasture sward, but also on the availability of information. The specific characteristics and some general questions included:

- **Source of Information**: Was the management tactic underpinned by scientific research that took place in the region? Had the information been collected and synthesised with long-standing and successful 'regional experts'? Had the management strategy been fully tested operationally and integrated into farm budgets?
- **Communication**: Was the information generally available throughout the region? Was the information in a booklet aimed at producers and available through a regional agricultural office or private consultant?
- **Evidence of Adoption**: Was the management strategy evident in specific surveys or in historical statistics? How widely was the strategy adopted in the region?

This evidence often pointed towards stocking rates or timing of grazing pressure as a major component of the differences. While this provided some useful insights, the problem remained that it was not actually *tangible evidence* of over stocking and, as we acknowledged in our advice, the assessments we made were largely based on inference and characterised by a high level of uncertainty. We found that for regional approaches to farm risk management, the more one moved toward the management end of the pipeline, the more uncertain the information and the more difficult the interpretation regarding the cause and effect.

Role of agricultural professionals

We saw our role as presenting the facts, interpreting the likely cause and effects, and warning of possible consequences, within a framework that allowed decisions to be made. There were inherent constraints in providing assessments in rapid (monthly or less) time, given data availability and access. Consequently there were times when the uncertainties were large, i.e. the data incomplete or the theory complex, so that either scientific judgement had to be used or else it was acknowledged that lack of information prevented any conclusion. While scientific judgement has a good many of the properties of ordinary human judgement, its distinguishing features are in having 'a feel for limits' and in our case understanding what 'nature will or will not do' (3).

There were considerable differences in the quality and availability of information and data to use as evidence. Often we relied on 'expert witnesses' for evidence of actions and 'norms' for a particular region and this depends upon the 'expert witnesses' providing comprehensive and objective evidence. To achieve this we used structured interviews, cross referencing, clarification, peer review and secondary consultation with the experts. In many cases their reputation was important.

Some question the need for such objectivity when it is obvious to them that the farming region needs help. However, history has shown that purely subjective assessments can be unreliable and demanding on the public purse (eg 1). In part objective analysis is justified by the need to be seen to be doing the right thing with taxpayers funds and to ensure that some groups do not gain an 'unfair advantage' from the system. Certainly, we were conscious of the need to satisfy enquires at the regular inspections by Senate Estimates. Furthermore the submission to Cabinet is vetted by other portfolios, particularly Finance and the Treasury, who require some supporting evidence to give their assent or support for a proposal in the Commonwealth system, where it competes with other priorities for government expenditure. Finally our democratic system depends at least partly upon there being community confidence in the system. Internationally, the WTO does, subject to certain conditions under its green box categories, allow direct payments from government to producers facing severe natural disasters.

At times we found it a struggle to separate giving objective assessments from an emotional response to the situation that many rural communities were experiencing. Maintaining scientific objectivity is a tenuous state. Although other players were making the difficult decisions, we could not escape the responsibilities that interpreting the advice imposed. We did not see it as our responsibility to act as a lobbyist for a particular course of action.

As with the situation on farm, there is a responsibility on government to provide decisions that balance, environmental, economic and social objectives. The national drought policy has as its second objective "to maintain and protect Australia's agricultural and environmental resource base during periods of extreme climatic stress". An ongoing concern was that EC assessments do not always fully consider the consequences for long-term environmental risks.

Considering the broader role of agricultural professionals we are conscious that producers, in making their own decisions, deserve the best information and advice. Agronomists are thus key knowledge brokers because they understand the broader systems at work, can foresight the consequences of different actions, provide essential data and customised opinions.

Conclusions

Most agronomists would probably take the opinion of the King of Brobdingnag (in Jonathon Swift's *Gulliver's Travels*), that "whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together", as an article of faith. Nonetheless, we support Snow's (4) entreaty "to be humble and learn the nature of politics. Politicians have to cope with the day's tasks….It is in the nature of politics that the short-term duties come first. It is the duty of the rest of us, and perhaps most of all the generations which are going to live in what is now the future, to keep before the world its long-term fate."

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